

# California Light Duty Vehicle Survey

## Inputs and Methods for the 2013 Transportation Energy Demand Forecast

Hearing Room A

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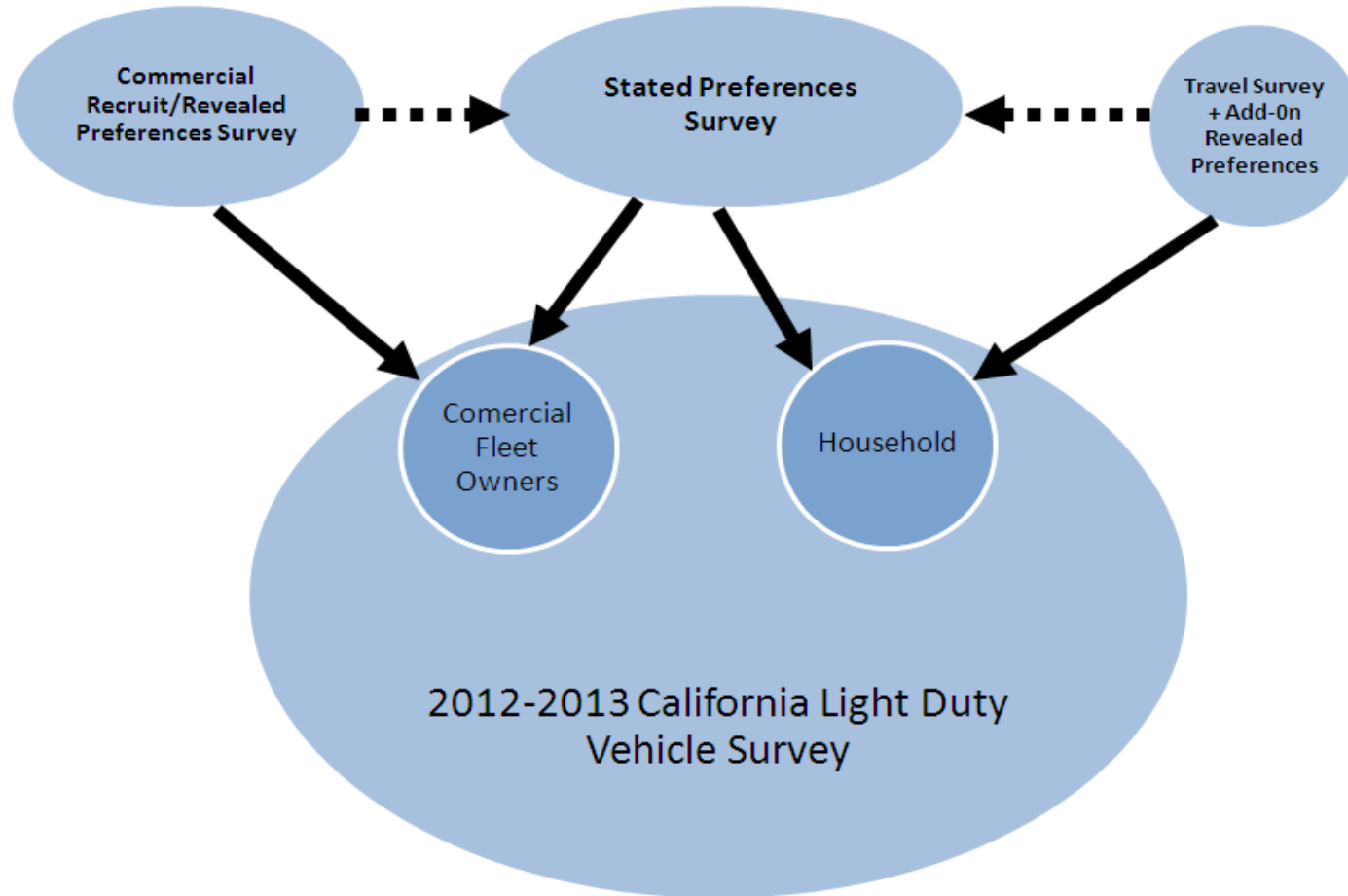


# California Vehicle Survey (CVS)

- Energy Commission periodically conducts a survey of residential and commercial Light Duty Vehicle (LDV) fleet owners to build and update two LDV models:
  - Personal Vehicle Choice (PVC) model
  - Commercial Vehicle Choice (CVC) model
- These updated vehicle choice models are used in forecasting and analysis of LDV vehicle demand for the two market segments.



# California Vehicle Survey



# Consumer Preferences

- Survey is a two-phase survey:
  - First phase: collects economic and demographic data, and the revealed preferences of consumers on vehicles commercially available in the market
  - Second phase: collects data on consumer preferences for all vehicle and fuel types, including those that are not yet commercially available on the market
- Since some of these vehicles and technologies are not yet in the market, vehicle survey relies on what consumers say they prefer, or “**stated preferences**”, through the hypothetical choices they make.
- These hypothetical vehicles are described and presented to respondents by a set of 12 attributes, displayed in the example below.



# SP Instrument

## Choice Set 1

Please carefully review each vehicle and all its features below. Assuming these are the only vehicles available to you to purchase, please select the ONE vehicle you would most likely purchase.

Vehicle Choice 1	Vehicle A	Vehicle B	Vehicle C	Vehicle D
Vehicle Type	Small SUV	Small Car	Small SUV	Mid-Size Car
Fuel Type	Gasoline only vehicle	Compressed Natural Gas only vehicle	Diesel Hybrid Electric vehicle	Battery Electric vehicle
Vehicle Models Available	27	1	1	1
Model Year	New	2009	New	New
Vehicle Price	\$24,518	\$14,316	\$36,090	\$29,831
Purchase Incentive	None	HOV lane access	None	\$7500 Tax Credit
MPG/Fuel Economy	27.8	25.9	34.9	101.0
Cost per 100 Miles	\$20.01	\$4.48	\$11.52	\$6.76
Refueling Station Availability	Refuel at station	Refuel at a "fast fill" station	Refuel at station	Plug in at home and at work
Refueling Time	9 minutes	15 minutes	3 minutes	24 minutes
Vehicle Range	500 miles	250 miles	550 miles	150 miles
Trunk/Cargo Space	83 cubic feet	3 cubic feet	61 cubic feet	14 cubic feet
Annual Maintenance Cost	\$461	\$319	\$524	\$322
Acceleration Rate (0-60 mph)	5.9 seconds	14.4 seconds	6.6 seconds	9.0 seconds
Select One	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



# Vehicle & Fuel Types in the Survey

Vehicle Type	Fuel Type
Small car	Gasoline only vehicle
Mid-size car	Gasoline Hybrid Electric vehicle (HEV)
Large car	Gasoline Plug-in Hybrid Electric vehicle (PHEV)
Sport car	Gasoline - ethanol Flex Fuel vehicle (E85 FFV)
Small SUV	Diesel only vehicle
Mid-size SUV	Diesel Hybrid Electric vehicle (HEV)
Large SUV	Compressed Natural Gas (CNG) only vehicle
Minivan	Compressed Natural Gas (CNG) - Gasoline Bi-fuel vehicle
Van	Compressed Natural Gas Hybrid Electric vehicle (HEV)
Small pick-up truck	Battery Electric vehicle (BEV)
Standard pick-up truck	Hydrogen Fuel Cell vehicle



# Incentives and Refueling Options

Type of Vehicle	Refueling Options
Gasoline or Diesel only	Refuel at station
Compressed Natural Gas (CNG)	Refuel at home or “fast fill” station
Plug-in Hybrid Electric (PHEV)	Refuel at gasoline station, or charge at home, work or station
Battery Electric vehicle (BEV)	Plug in at home, work, and/or charging station
Hydrogen vehicle	Hydrogen fueling station

Incentive	
HOV Lane Access	Allows travel in HOV carpool lane as a single driver
Free Parking	Allows access to free parking in designated spots
Tax Credit	Allows reduction in annual income taxes owed
Rebate	Allows you to receive certain amount of money off the price of vehicle, approximately 6 months after purchase



# New for the 2012-2013 CVS: Extensive Collaboration & Coordination

- The household vehicle survey was integrated with the Caltrans' California Household Travel Survey (CHTS), as a satellite survey, to follow up the CHTS survey.
- The 3500+ households participating in the vehicle survey came from 42,000+ households who completed Caltrans travel survey.
- Most of the first phase data for the household vehicle survey was collected in the travel survey.
  - Designed and executed a shorter add-on vehicle survey to verify currency of key CHTS survey data and fill in data gap
- We collaborated and coordinated with Caltrans on survey design, execution and data collection for our household survey.
- We collaborated with ARB on our vehicle survey design, and vehicle attribute values for the SP survey.





# California Household Travel & Vehicle Surveys

## Caltrans Household Travel Survey

All Californians 42,000+

CEC  
California  
Vehicle  
Survey  
3500+



# Key Differences in Design

- Address-based CHTS sample allowed for inclusion of cell-phone only households.
- A built-in algorithm allowed combining the two survey phases into one, for the online household survey participants.
- Additional fuel types and vehicle technologies
- Changed measurement of refueling station availability
- Added and revised attributes
- Added questions on solar energy access plans
- Differentiated between leased and purchased vehicles in the revealed preferences survey data.
- For the first time a focus group session was conducted in Spanish and the main survey was conducted in both Spanish and English.



# Travel Survey Shows

Number of Household Vehicles	Frequency	Percent	Trips per household/ person per day
0	2,459	5.80%	7.5
1	12,678	29.80%	7.3
2	18,657	44.00%	11.5
3 or More	8,637	20.40%	9.3
<i>Total</i>	42,431	100.00%	

Reason of No Possession of Vehicle	Percent
Too expensive to buy	20%
No driver's license/Cannot drive	18%
Too expensive to maintain (gas/insurance/repairs)	13%
Use public transit/Car share/Bike/Walk	13%
Do not need a car - can do what I need and want to without a motor vehicle	11%
Health/age related reasons	8%
Get rides from other people	4%
No place to park	2%
Other	11%
<i>Total</i>	100%

Source: 2012-2013 California Household Travel Survey



# From Our Focus Groups We Learned

- Participants were unanimous on the role of vehicle prices in their choice.
- Households are likely to use rental cars for their long distance travel.
- Style and safety matter to some households.
- Reliability of vehicle is important to both businesses and households.
- Participants did not object to buying alternative vehicles, if they are price competitive, and have a few years of good consumer feedback/reviews.
- Style/status cars mattered to smaller/sales oriented businesses.
- Commercial participants were more willing to consider alternative technologies.



# Commercial Focus Group Says...

## Businesses

- Are more sensitive to fuel cost and can switch to alternative compact vehicles, if they reduce fuel cost. For a business' compact vehicle needs, hybrid compacts won over when fuel prices were high and during the recession.
- Which require use of larger vehicles will stick with the makes and models they have, if the vehicles are reliable and have good performance, regardless of the fuel cost.
- Use rental cars for infrequent special vehicle needs
- See permit and process issues as barriers to obtain & provide refueling/recharging options at work



# Focus Group Says...

- Both businesses and households showed little awareness of public policy and incentives
- They suggested use of:
  - Billboards, social media, talk radio, internet and media to communicate public policy and incentives.
  - Manufacturers and dealers communicate fuel and vehicle incentives.
- Their current awareness shows the need for education on alternative fuels and vehicle technologies.
- They did not want to be the “guinea pigs”.



# 2009 Model Showed

- Vehicle price is most significant to both households and businesses.
- Households in San Francisco have higher preference for hybrid cars
- Households in Los Angeles had higher preference for sports cars.
- Tax credit was significant to all households and all incentives, except reduced tolls, were significant to households with more than one vehicle.
- Agriculture/manufacturing/construction/utilities preferred diesel to gasoline vehicles.
- All industry groups had highest preference for standard trucks, followed by compact trucks, SUVs and vans.
- HOV lane use was the only significant incentive for businesses.



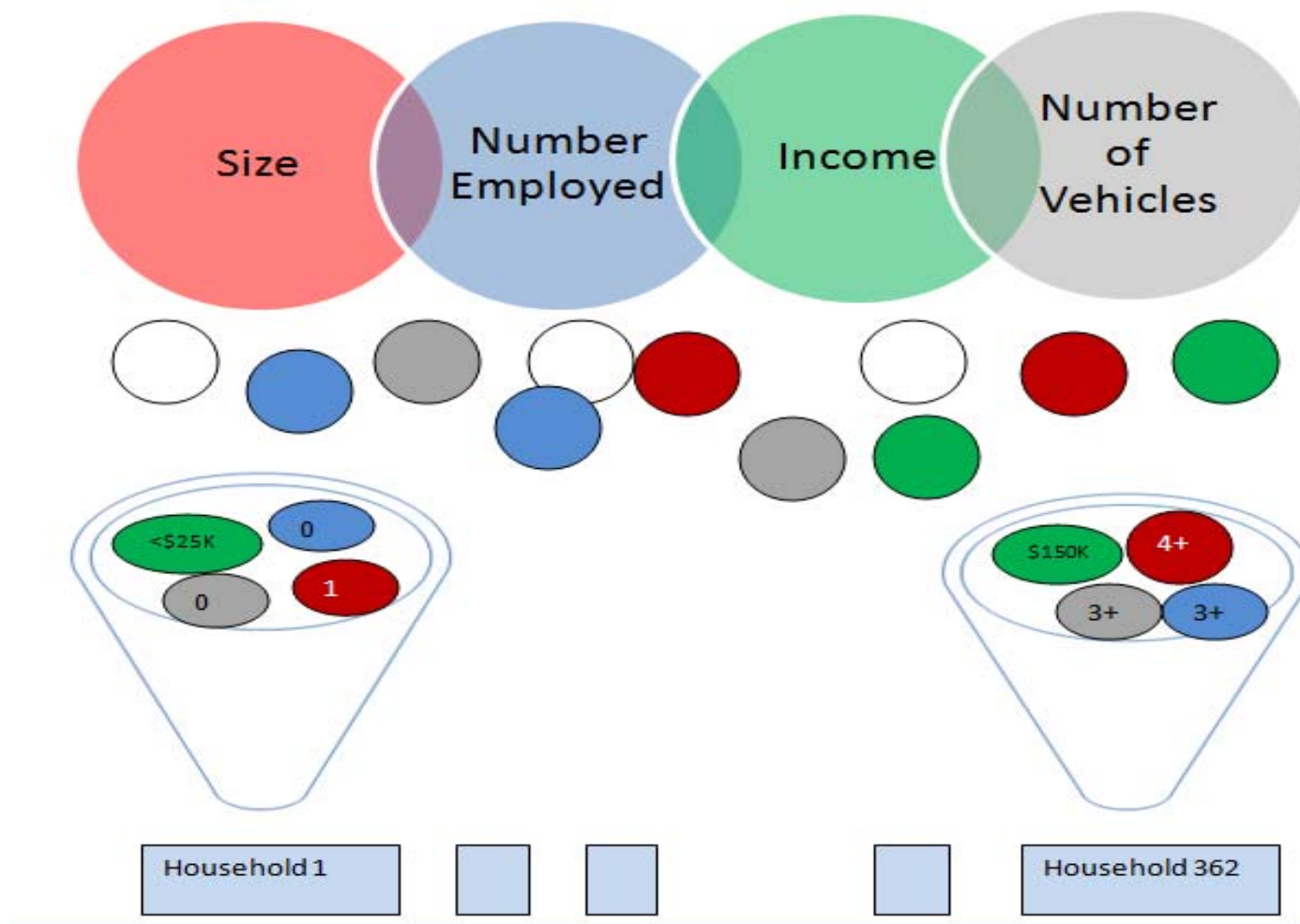
# What is a Household?

- A household is composed of a number of people occupying a house.
- Group quarters, such as nursing homes, dormitories, prisons, etc, are not considered households.
- Households in the survey are individual households of all variations.
- Households in our forecast are defined by their size, number of workers, income class, and number of vehicles they own.





# California Households



# Next Steps

- Our survey is currently in progress. We will use the resulting models, as they become available.
- We are evaluating a number of new modeling options for 2015 IEPR and beyond, including a new integrated vehicle choice and utilization model based on the 2013 integrated travel and vehicle survey data.

